

Eastern Upper Peninsula Rapid Watershed Assessment

Resource Profile



October 2008

Prepared by
Chippewa/East Mackinac Conservation District
2847 Ashmun Street
Sault Ste. Marie, Michigan 49783



Eastern Upper Peninsula Watershed Resource Profile

Table of Contents

Introduction—Project area	1
Jurisdictions	2
Two Hearted—Betsy Subwatershed	3
Tahquamenon River Subwatershed	4
Waiska River Subwatershed	5
Physical Description — Land Use/Land Cover	6
Forest Land	7
Land Ownership	8
Common Resource Areas	9
Census and Social Data	11
Soils	13
Precipitation and Temperature	15
Land Capability Class	16
Farm Land	18
Common Land Units	19
Farm Bill Programs	20
Sleeper Lake Fire	21
303d Sites	22
National Wetlands Inventory	23
Studies and Assessments	24
Resource Concerns	24

Resource Profile

Eastern Upper Peninsula Watershed

Two Hearted River Watershed
HUC 04020201

Tahquamenon River Watershed
HUC 04020202

Waiska River Watershed
HUC 04020203



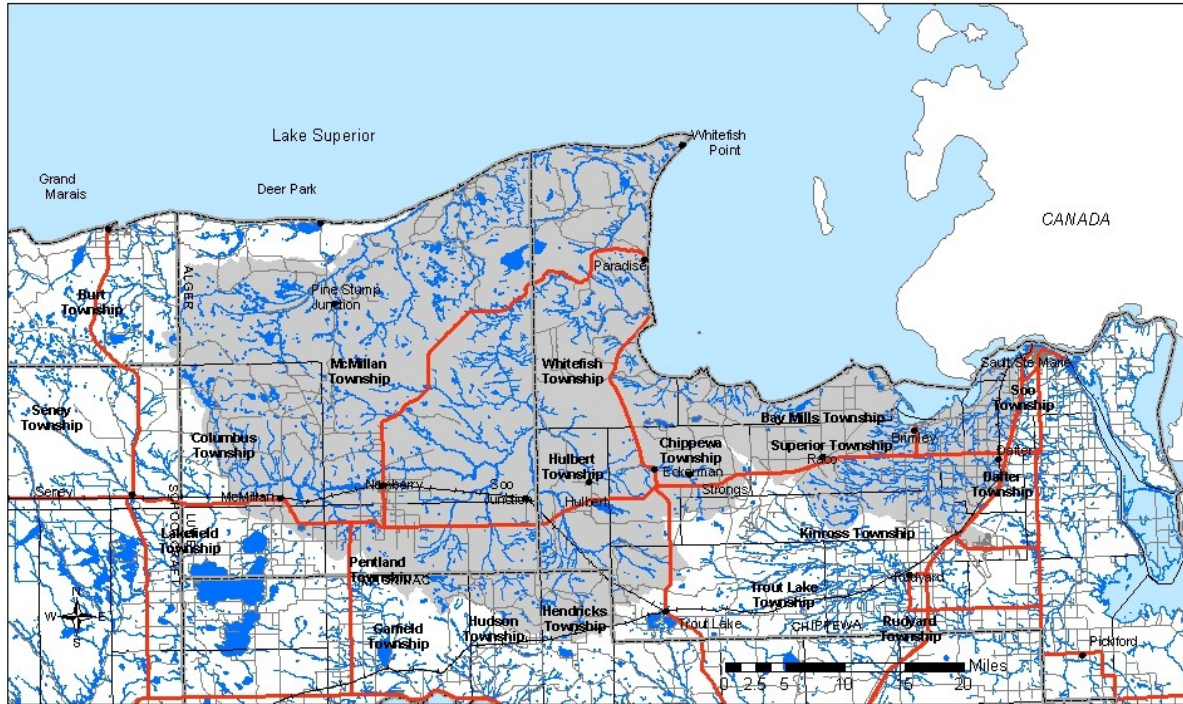
Source: USDA, NRCS - Geodata: Hydrologic Units
Mapped by CEMCD on March 3, 2008

Introduction

The Eastern Upper Peninsula watershed is a compilation of three 8-digit Hydrologic Unit Code (HUC) sub basins covering 975,878 acres. The three main sub watersheds include the Two Hearted (04020201), Waiska (04020203), and Tahquamenon Rivers (04020202).

The Tahquamenon River watershed is the largest drainage basin, with 517,968 acres. The Two Hearted River sub watershed is the next largest, consisting of several separate distinct lake drainage basins, with 269,154 acres. The Waiskey River basin is the remaining sub watershed in the assessment, with 188,755 acres.

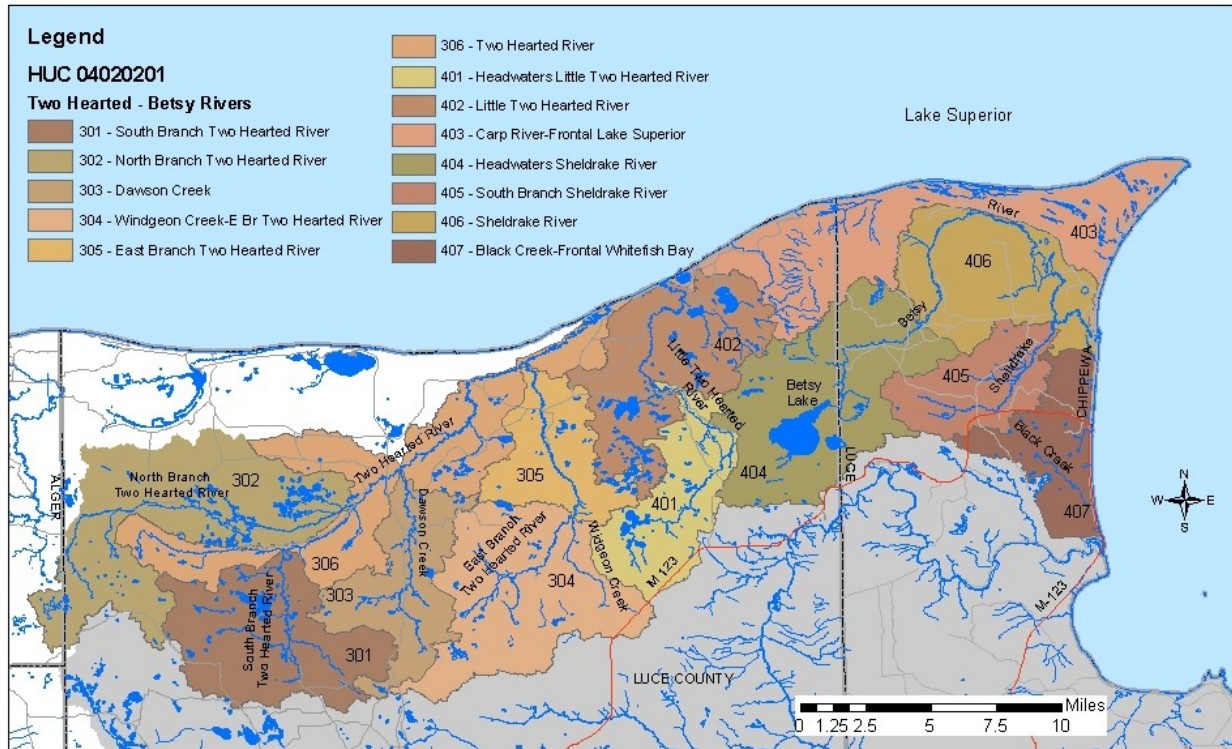
Local Jurisdictions



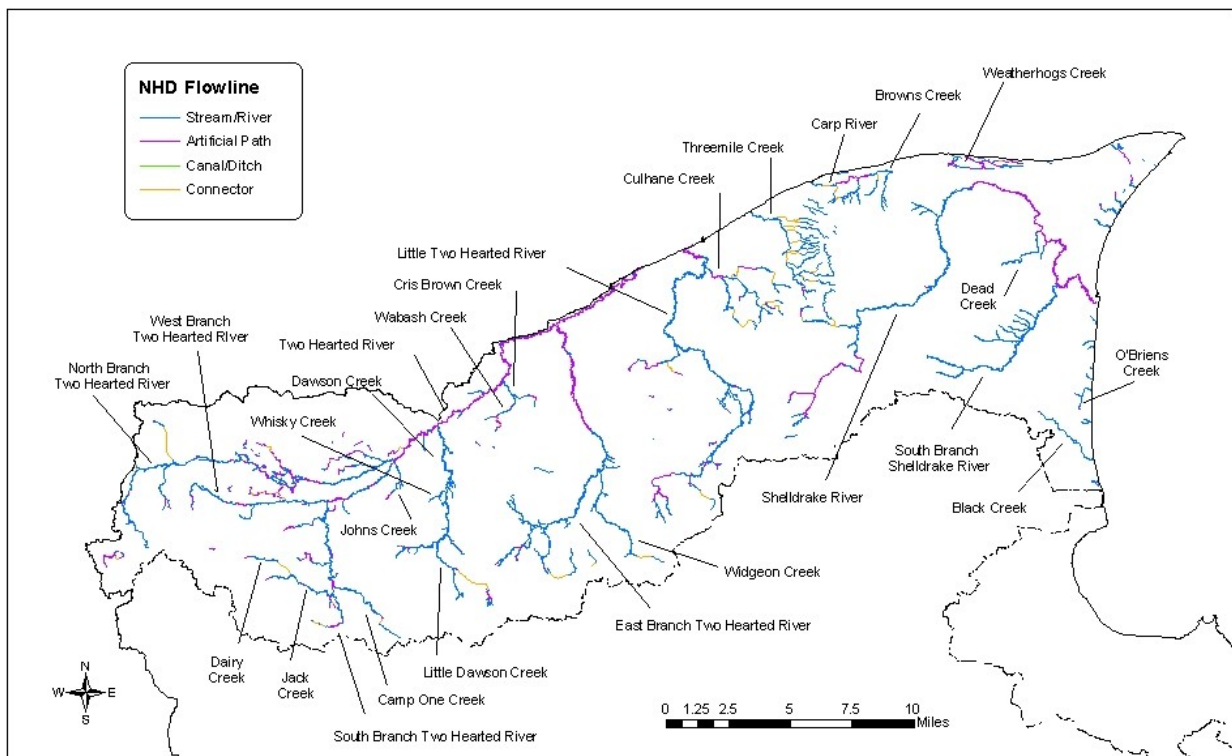
Source: USDA, NRCS - Geodata; Hydrologic Units
Mapped by CEMCD on March 3, 2008

Population in RWA Area	Population	Total	Total	Acres	Square Miles	Pop Density	Population
Source: U.S. Census 2000	2000	Acres	Square Miles	In RWA	in RWA	Per Sq Mile	in RWA
Sault Ste. Marie	16,542	9,484.80	14.82	2,977.61	4.65	1,116.30	5,194
Soo Township	2,652	32,108.80	50.17	7,146.97	11.17	52.9	591
Dafer Township	1,304	30,617.60	47.84	18,653.60	29.15	27.3	796
Kinross Township	5,922	76,844.80	120.07	26,109.37	40.80	49.3	2,011
Superior Township	1,329	66,028.80	103.17	62,117.53	97.06	12.9	1,252
Bay Mills Township	1,214	41,395.20	64.68	41,998.95	65.62	18.8	1,234
Whitefish Township	588	154,566.40	241.51	157,314.58	245.80	2.4	590
Hulbert Township	211	45,478.40	71.06	45,925.01	71.76	3	215
Trout Lake Township	465	90,694.40	141.71	15,752.32	24.61	3.3	81
Chippewa Township	238	60,736.00	94.90	56,697.70	88.59	2.5	221
Hendricks Township	183	50,502.40	78.91	20,639.88	32.25	2.3	74
Hudson Township	214	43,993.60	68.74	15,210.84	23.77	3.1	74
Garfield Township	1,251	85,849.60	134.14	8,133.25	12.71	9.3	118
McMillan Township	3,947	378,899.20	592.03	349,240.31	545.69	6.7	3,656
Pentland Township	1,788	68,422.40	106.91	64,147.05	100.23	16.7	1,674
Lakefield Township	1,074	40,550.40	63.36	7,905.71	12.35	16.9	209
Columbus Township	215	90,099.20	140.78	74,175.16	115.90	1.5	174
Seney Township	180	136,902.40	213.91	122.52	0.19	0.8	0
Burt Township	480	147,808.00	230.95	1,609.00	2.51	2.1	5
Totals	39,797	1,650,982.40	2,579.66	975,877.36	1,524.81		18,169

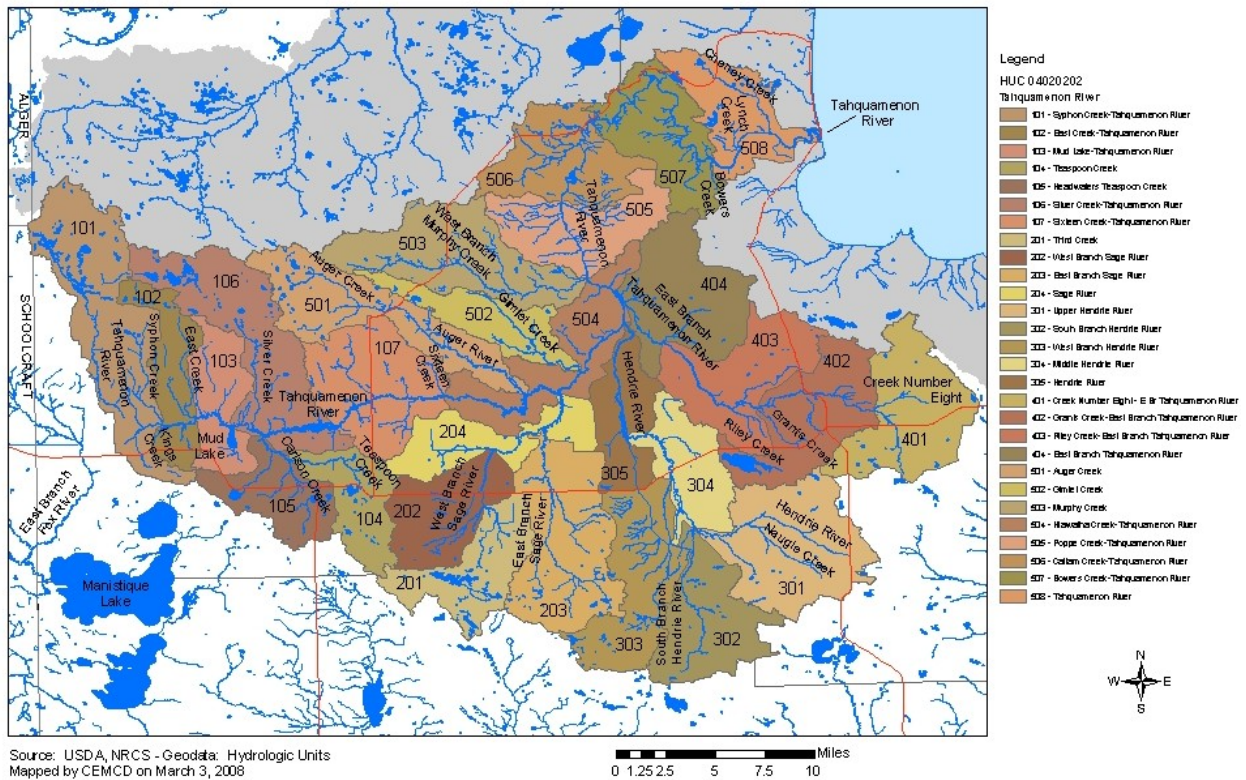
Two Hearted—Betsy Subwatershed



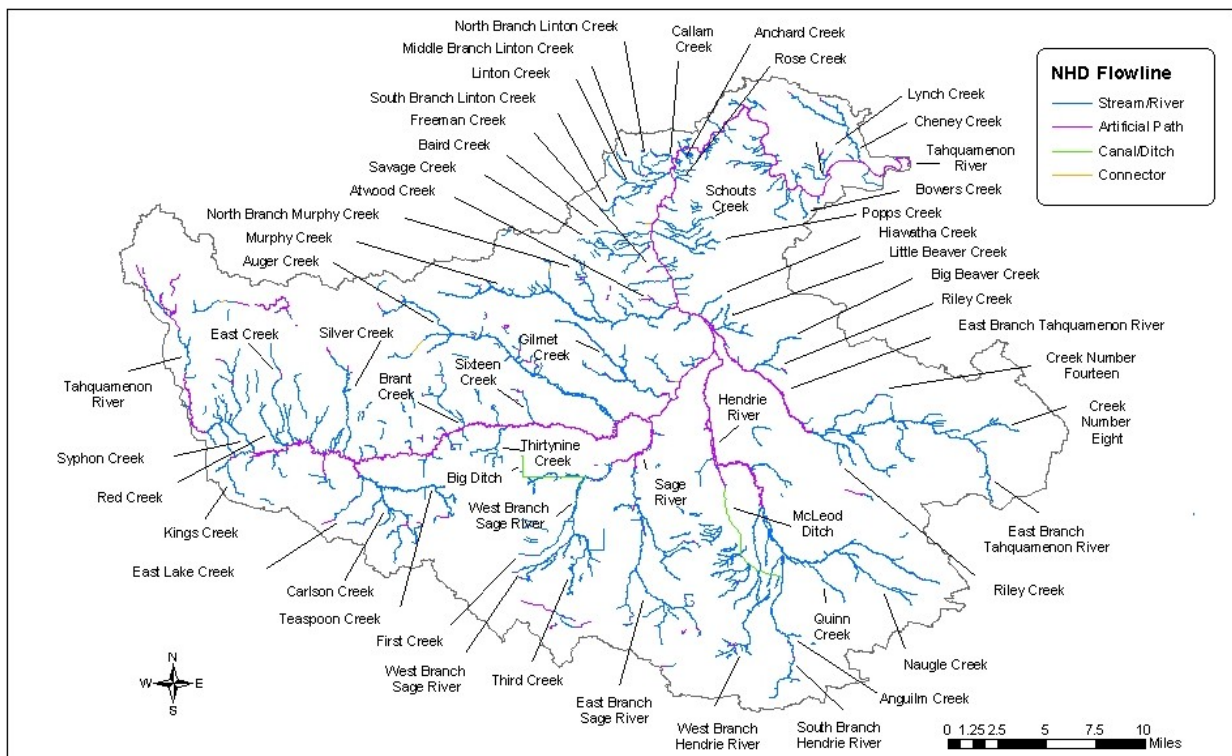
Two Hearted-Betsy Watershed — Creeks, Streams and Rivers



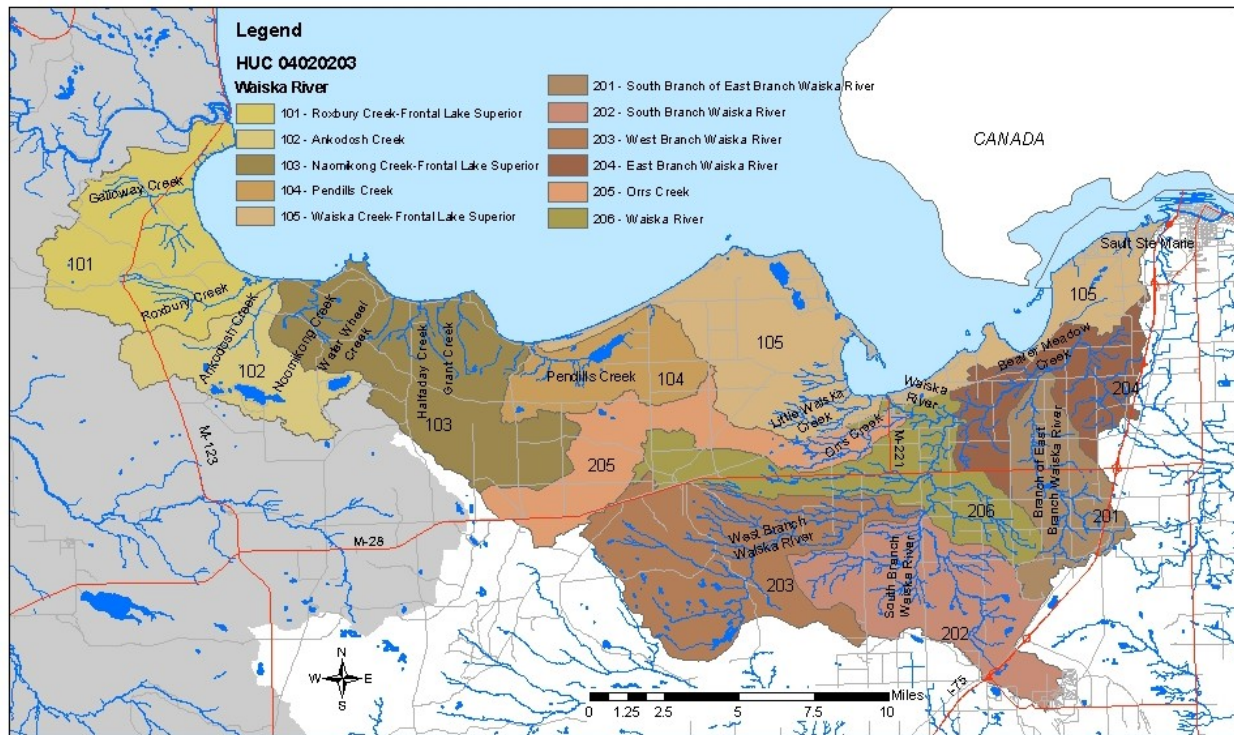
Tahquamenon River Subwatershed



Tahquamenon River Watershed — Creeks, Streams and Rivers

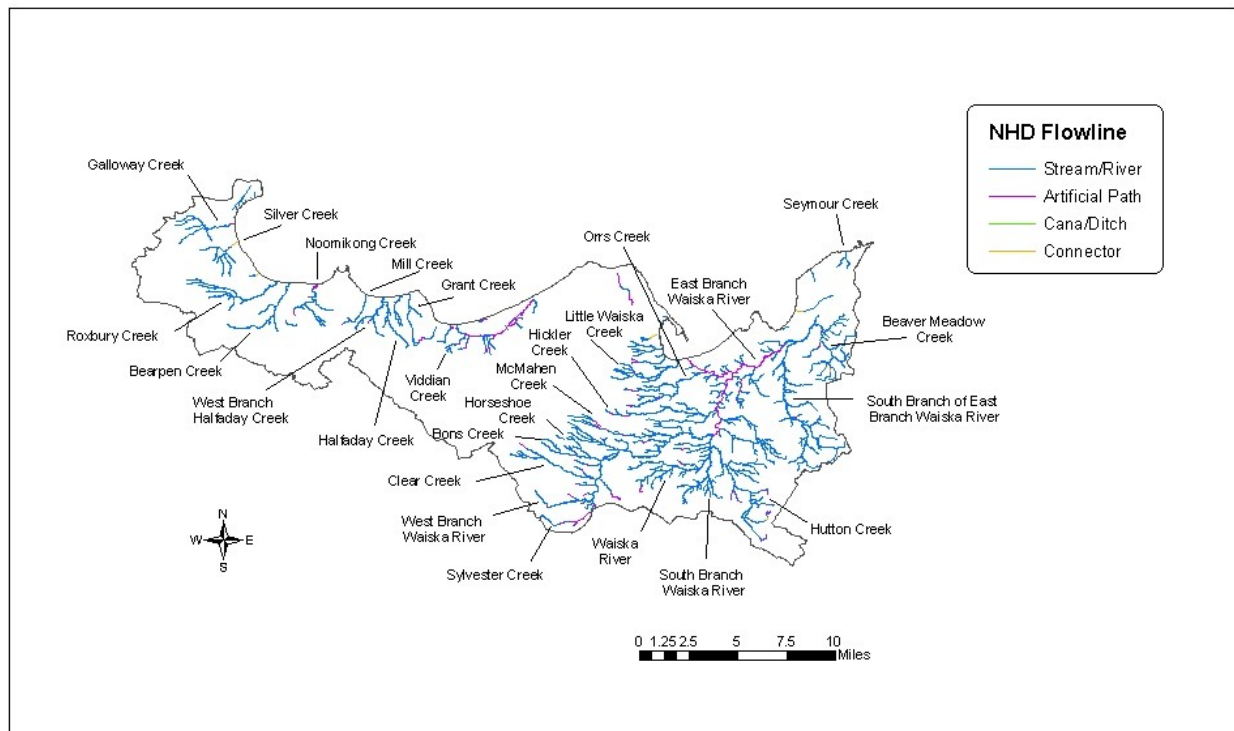


Waika River Subwatershed



Source: USDA, NRCS - Geodata: Hydrologic Units
 Mapped by CEMCD on March 3, 2008

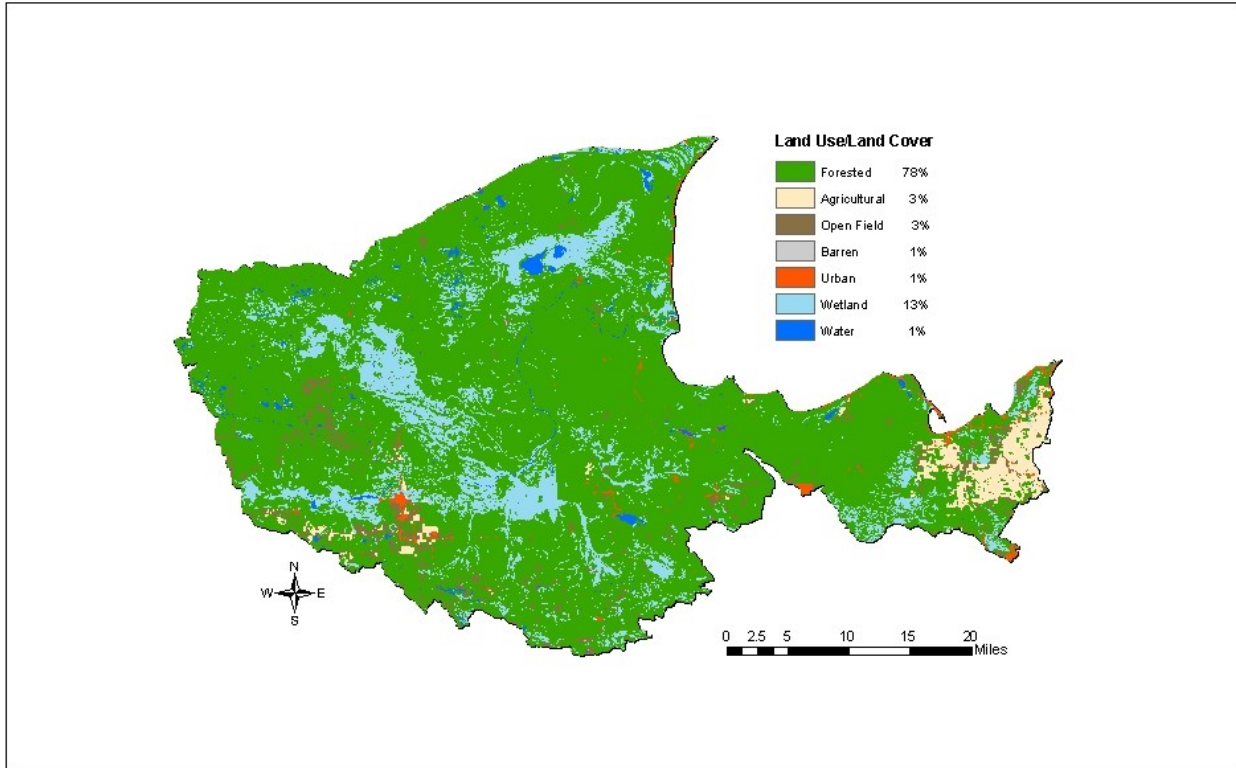
Waika River Watershed — Creeks, Streams and Rivers



Source: National Hydrography Dataset (NHD)
 Mapped by CEMCD on March 24, 2008

Physical Description

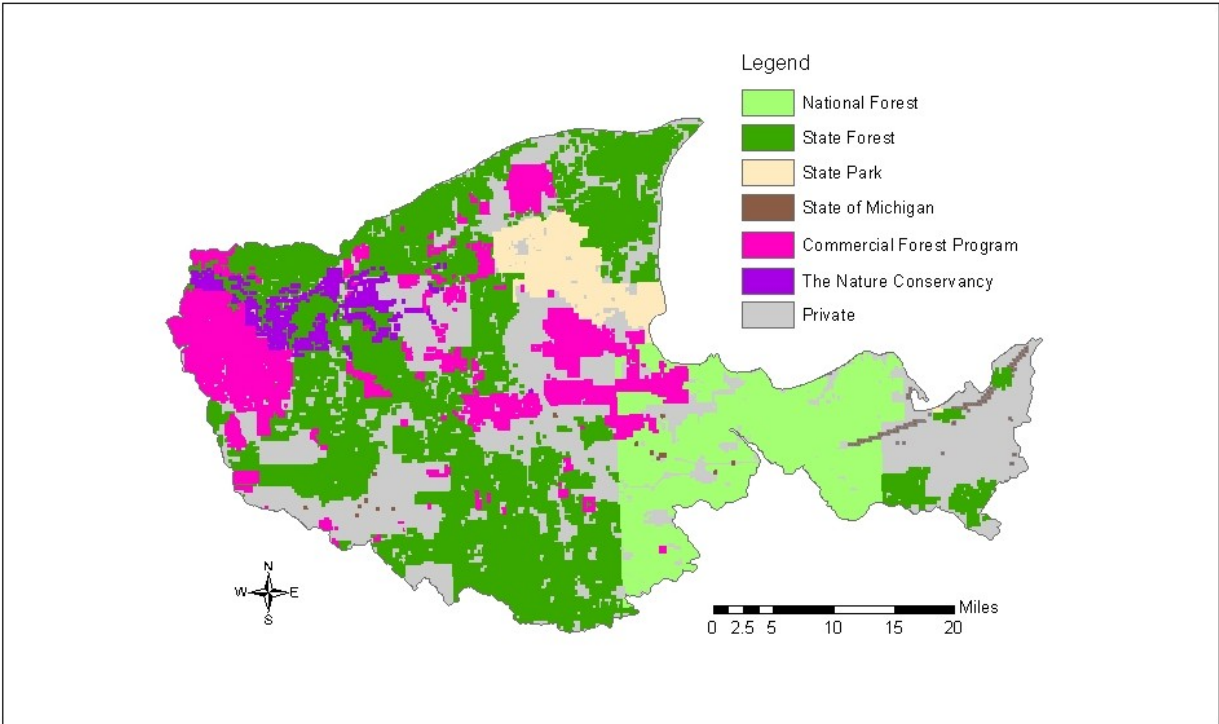
The EUP watershed land use/land cover is predominately forest cover and wetland. Less than 10% of the watershed is considered developed for urban or agriculture.



Source: USDA, NRCS: Land Use/Land Cover
Mapped by CEMCD on March 3, 2008

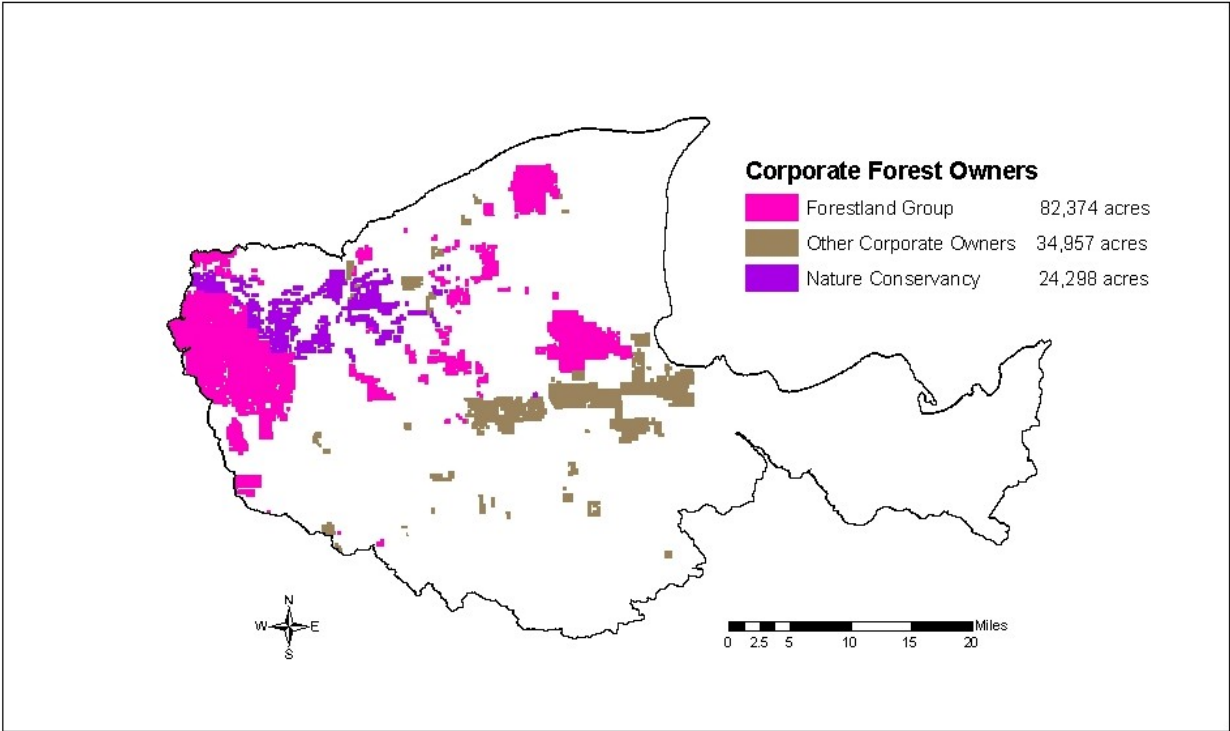
EUP Rapid Watershed Area	Acres	Percent
Forest	764,846	78%
Agriculture	26,268	3%
Open Field	30,068	3%
Barren	457	1%
Urban	9,419	1%
Wetland	131,892	13%
Water	12,927	1%
Totals	975,877	100%

Forest Land



Source: USDA, NRCS - Geodata: gap_stewardship_up
Mapped by CEMCD on March 5, 2008

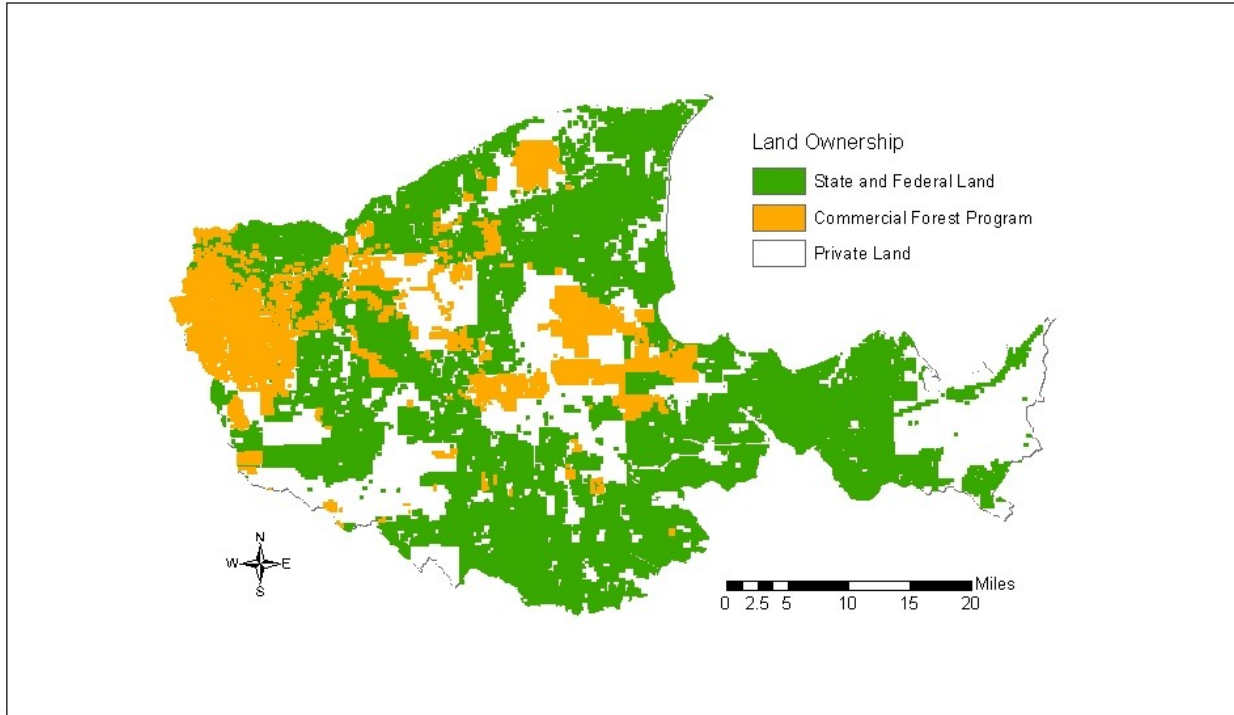
Corporate Forest Owners



Source: Michigan Technological University
Mapped by CEMCD on March 3, 2008

Land Ownership

Most of the land is in public ownership, either through State ownership (41%) or Federal (15%). A large contingent is owned by corporate interests (15%), and the remaining is privately owned (30%).



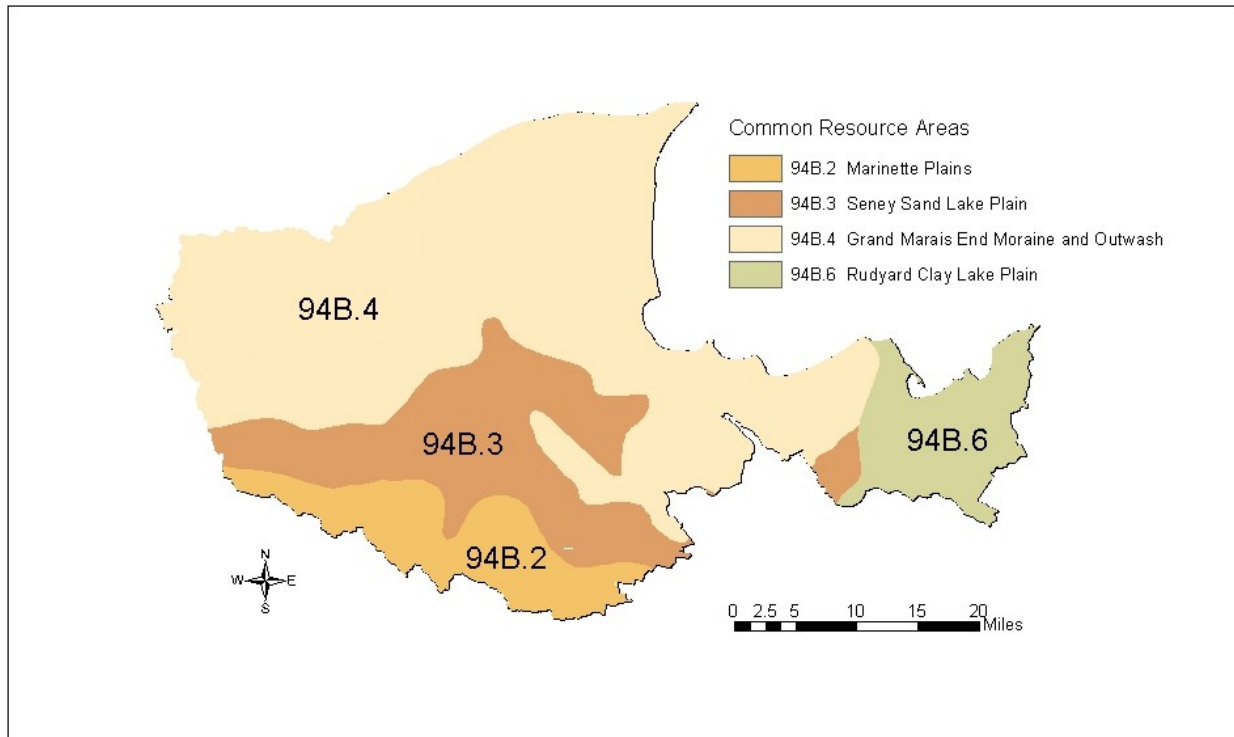
Source: USDA, NRCS - Geodata: gap_stewardship_up
Mapped by CEMCD on March 3, 2008

Land Ownership	Acres	Percent
State and Federal Lands	541,490	55%
Corporate Lands	141,619	15%
Private Land	292,768	30%
Totals	975,877	100%

State and Federal Land	Acres	Percent
National Forest	144,753	15%
State Forest	351,113	36%
State Park	41,348	4%
State of Michigan	4,277	1%
Non-Public	434,386	45%
Totals	975,877	45%

Common Resource Areas

The common resource areas for the watershed have been designated as Grand Marais End Moraine & Outwash, Seney Sand Lake Plain, Marinette Plains, and the Rudyard Clay Lake Plain.



Source: USDA, NRCS - Geodata: Common Resource Areas
Mapped by CEMCD on February 28, 2008

The majority (59%) of land is *94B.4 Grand Marais End Moraine & Outwash*, which constitutes nearly level to moderately steep, rocky loamy till, alluvium and outwash /eolian sands. Mostly deciduous and coniferous forest. Dominant land use is woodland and recreation. Primary resource concerns are soil erosion, groundwater quality, surface water quality, forestland productivity, wildlife habitat.

Almost a third (21%) of the assessment area is *Seney Sand Lake Plain*, nearly level to gently rolling very poorly drained to well drained sandy soils on lake plains. This area also contains many large shallow to very deep organic soils over sandy materials. Mostly coniferous forest. Dominant land use is forestland and wildlife habitat. Primary resource concerns are soil erosion, groundwater quality, surface water quality, forestland productivity and wildlife habitat.

Over 10% is *Marinette Plains*, nearly level and gently sloping somewhat poorly drained sandy soils on lake plains with organic soils in the depressions. Mostly deciduous and coniferous forest and wetlands. Scattered cropland, grazing land, and the Green Bay-Lake Michigan shoreline. Primary resource concerns are soil erosion, groundwater quality, surface water quality, forestland productivity and wildlife habitat.

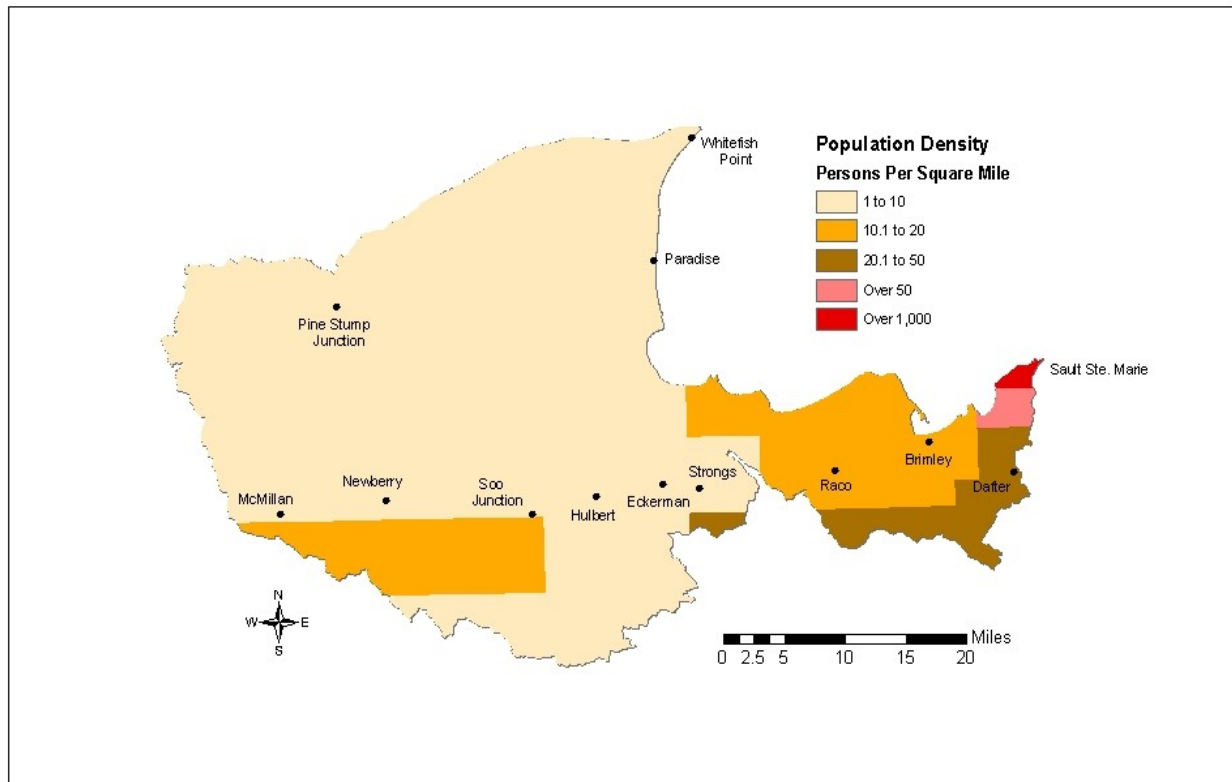
Common Resource Areas (continued)

The eastern fringe of the project area (9%) is the *Rudyard Clay Lake Plain*, nearly level poorly drained to well drained clayey soils on lake plains with some sandy beach ridges and low moraines. Mostly deciduous and coniferous forest. Predominant land use is woodland with some areas used for feed grains and dairy cattle. Primary resource concerns are soil erosion, groundwater quality, surface water quality, forestland productivity, forage quality on grazing land and wetland habitat restoration.

Common Resource Areas		
EUP Rapid Watershed Assessment Area	Acres	Percent
94B.2 - Marinette Plains	104,095	11%
94B.3 - Seney Sand Lake Plain	205,840	21%
94B.4 - Grand Marais End Moraine & Outwash	576,974	59%
94B.6 - Rudyard Clay Lake Plain	88,968	9%
Totals	975,877	100%

Census and Social Data

The total population of the watershed based on the 2000 census is 18,169 people. Per capita income is \$5,006 below the Michigan state average. The average poverty level is 13.2%.



Source: U.S. Census Bureau - Year 2000 Census
Mapped by CEMCD on February 28, 2008

Population in RWA Area	Population	Total	Total	Acres In RWA	Square Miles	Pop Density	Population
Source: U.S. Census 2000	2000	Acres	Square Miles		in RWA	Per Sq Mile	RWA
Sault Ste. Marie	16,542	9,484.80	14.82	2,977.61	4.65	1,116.30	5,194
Soo Township	2,652	32,108.80	50.17	7,146.97	11.17	52.9	591
Dafer Township	1,304	30,617.60	47.84	18,653.60	29.15	27.3	796
Kinross Township	5,922	76,844.80	120.07	26,109.37	40.80	49.3	2,011
Superior Township	1,329	66,028.80	103.17	62,117.53	97.06	12.9	1,252
Bay Mills Township	1,214	41,395.20	64.68	41,998.95	65.62	18.8	1,234
Whitefish Township	588	154,566.40	241.51	157,153.80	245.55	2.4	589
Hulbert Township	211	45,478.40	71.06	45,925.01	71.76	3	215
Trout Lake Township	465	90,694.40	141.71	15,752.32	24.61	3.3	81
Chippewa Township	238	60,736.00	94.90	56,697.70	88.59	2.5	221
Hendricks Township	183	50,502.40	78.91	20,639.88	32.25	2.3	74
Hudson Township	214	43,993.60	68.74	15,210.84	23.77	3.1	74
Garfield Township	1,251	85,849.60	134.14	8,133.25	12.71	9.3	118
McMillan Township	3,947	378,899.20	592.03	349,193.95	545.62	6.7	3,656
Pentland Township	1,788	68,422.40	106.91	64,147.05	100.23	16.7	1,674
Lakefield Township	1,074	40,550.40	63.36	7,905.71	12.35	16.9	209
Columbus Township	215	90,099.20	140.78	74,175.16	115.90	1.5	174
Seney Township	180	136,902.40	213.91	122.52	0.19	0.8	0
Burt Township	480	147,808.00	230.95	1,609.00	2.51	2.1	5
	39,797	1,650,982.40	2,579.66	975,670.22	1,524.48		18,168

Census and Social Data (continued)

Population Summary	Total	In RWA	Percent in RWA
Sault Ste. Marie	16,542	5,194	31%
Chippewa County	13,923	6,991	50%
Mackinac County	1,648	266	16%
Luce County	7,024	5,713	81%
Schoolcraft County	180	0	0%
Alger County	480	5	1%
Total	39,797	18,169	46%

Unemployment Rate	Percent
November 2007	
Alger County	8.8
Schoolcraft County	8.9
Mackinac County	13.1
Chippewa County	8.1
Luce County	8.3
Michigan	7.4

Poverty Rate	Percent
2005	
Alger County	13.4
Schoolcraft County	14.4
Mackinac County	10.5
Chippewa County	16.5
Luce County	17.9
Michigan	13.1

U.S. Census 2000 Per Capita Income	Dollars	Below State Average
Alger County	\$18,210	\$3,958
Schoolcraft County	\$17,137	\$5,031
Mackinac County	\$17,777	\$4,391
Chippewa County	\$15,858	\$6,310
Luce County	\$16,828	\$5,340
Michigan	\$22,168	

Median Household Income 2004	Dollars	Below State Average
Alger County	\$36,959	\$7,450
Schoolcraft County	\$33,573	\$10,836
Mackinac County	\$34,520	\$9,889
Chippewa County	\$34,378	\$10,031
Luce County	\$32,879	\$11,530
Michigan	\$44,409	

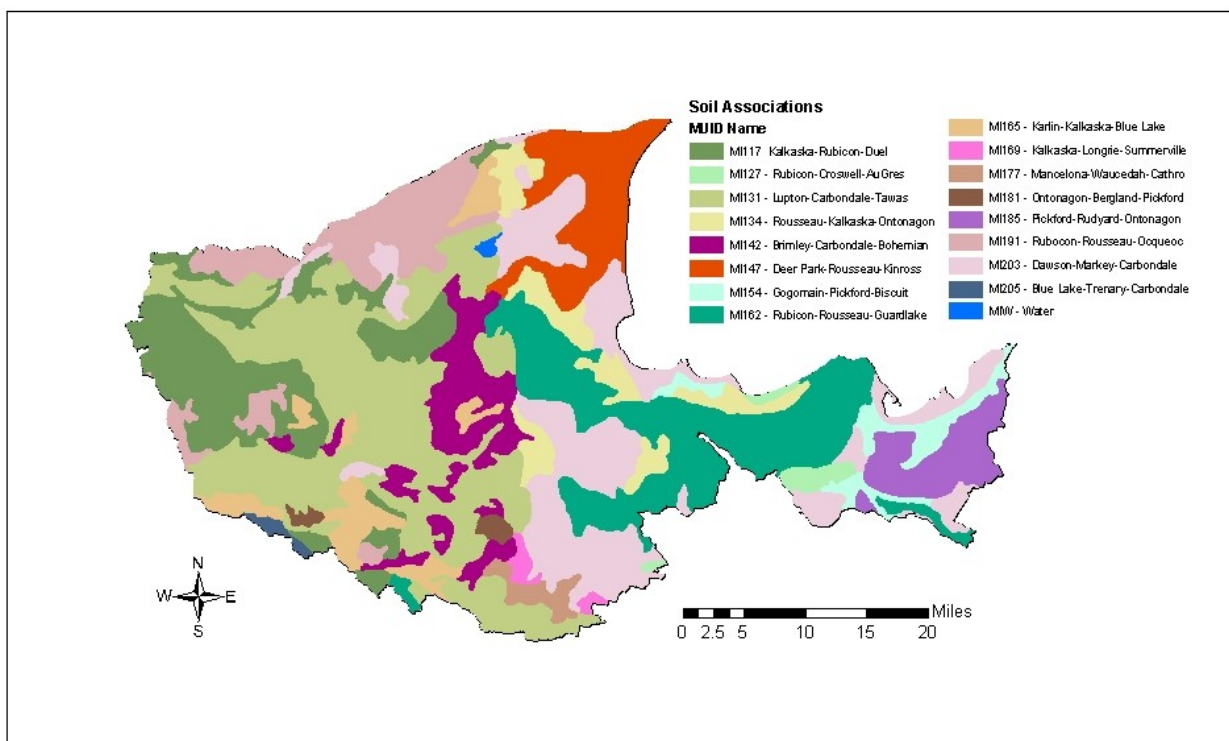
Soils

Primary soils in the watershed include: Deer Park-Dawson-Au Gres, Kalkaska-Rubicon, Fibre-Allendale-Pickford

The Deer Park-Dawson-Au Gres association is one large area located in the north-east part of Chippewa County near Whitefish Point. It consists mainly of very deep, nearly level to rolling, excessively drained, very poorly drained, and somewhat poorly drained, sandy and peaty soils on outwash plains, lake plains, and beach ridges.

The Kalkaska-Rubicon association occupies a broad area west of the Waika River drainage basin. These are very deep, nearly level to very steep, somewhat excessively drained and excessively drained, sandy soils on outwash plains and ground moraines.

The Fibre-Allendale-Pickford association occupies mainly the Waika River watershed, where agriculture operations are concentrated. These soils are very deep, nearly level, poorly drained and somewhat poorly drained, mucky, sandy, and loamy soils on lake plains, ground moraines, and outwash plains.

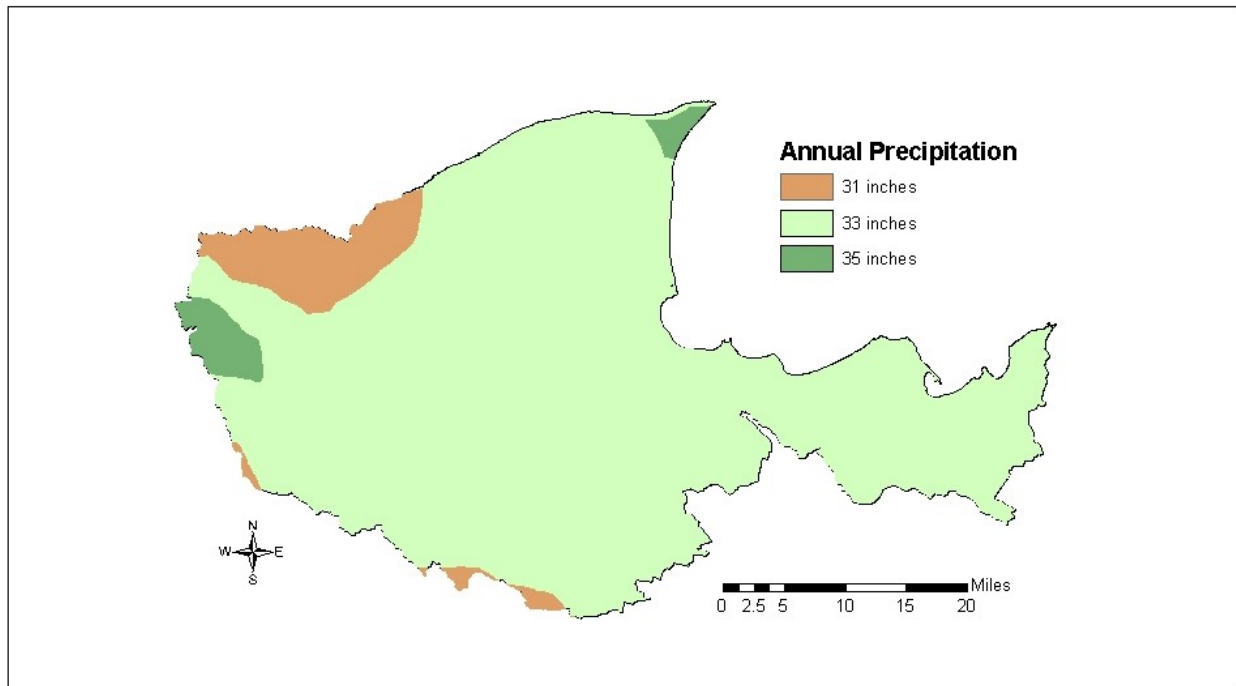


Source: USDA, NRCS - STATSGO Soils
Mapped by CEMCD on February 28, 2008

Soils (continued)

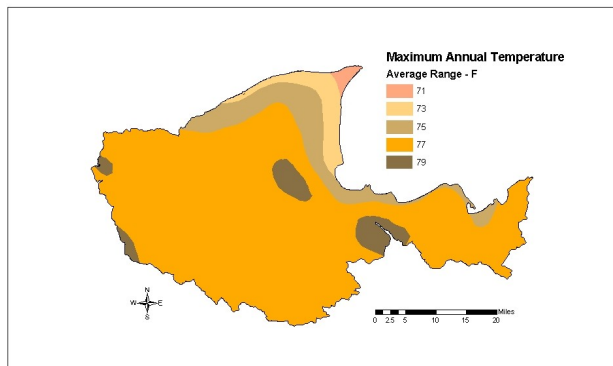
SOIL ASSOCIATIONS	Acres	Percent
Lupton-Carbondale-Tawas (MI 131)	224,631.90	23.02%
Dawson-Markey-Carbondale (MI 203)	146,274.90	14.99%
Rubicon-Rousseau-Guardlake (MI 162)	131,847.87	13.51%
Kalkaska-Rubicon-Duel (MI 117)	106,529.20	10.92%
Rubicon-Rousseau-Ocqueoc (MI 191)	70,157.10	7.19%
Brimley-Carbondale-Bohemian (MI 142)	59,242.10	6.07%
Deer Park-Rousseau-Kinross (MI 147)	56,357.39	5.78%
Rousseau-Kalkaska-Ontonagon (MI 134)	46,633.90	4.78%
Karlin-Kalkaska-Blue Lake (MI 165)	39,355.50	4.03%
Pickford-Rudyard-Ontonagon (MI 185)	35,385.50	3.63%
Gogomain-Pickford-Biscuit (MI 154)	23,611.20	2.42%
Mancelona-Waucedah-Cathro (MI 177)	11,163.80	1.14%
Rubicon-Croswell-Au Gres (MI 127)	9,205.10	0.94%
Ontonagon-Bergland-Pickford (MI 181)	5,572.80	0.57%
Kalkaska-Longrie-Summerville (MI 169)	5,332.30	0.55%
Blue Lake-Trenary-Carbondale (MI 205)	3,172.10	0.33%
Water (MI W)	1,404.70	0.14%
Totals	975,877.36	100.00%

Average Annual Precipitation



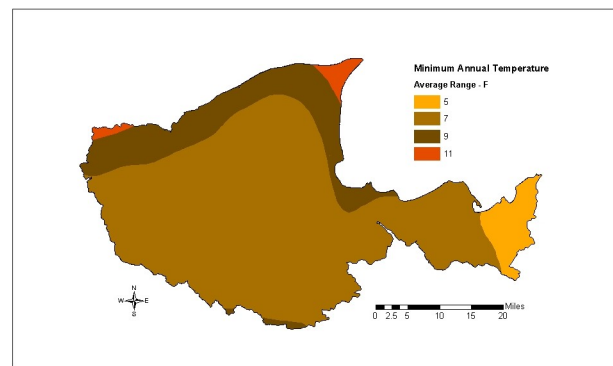
Source: USDA, NRCS - Geodata: Climate, Precipitation
Mapped by CEMCD on February 28, 2008

Temperature Ranges



Source: USDA, NRCS - Geodata: Climate, Temperature
Mapped by CEMCD on March 3, 2008

Maximum Annual Temperature Range



Source: USDA, NRCS - Geodata: Climate, Temperature
Mapped by CEMCD on March 3, 2008

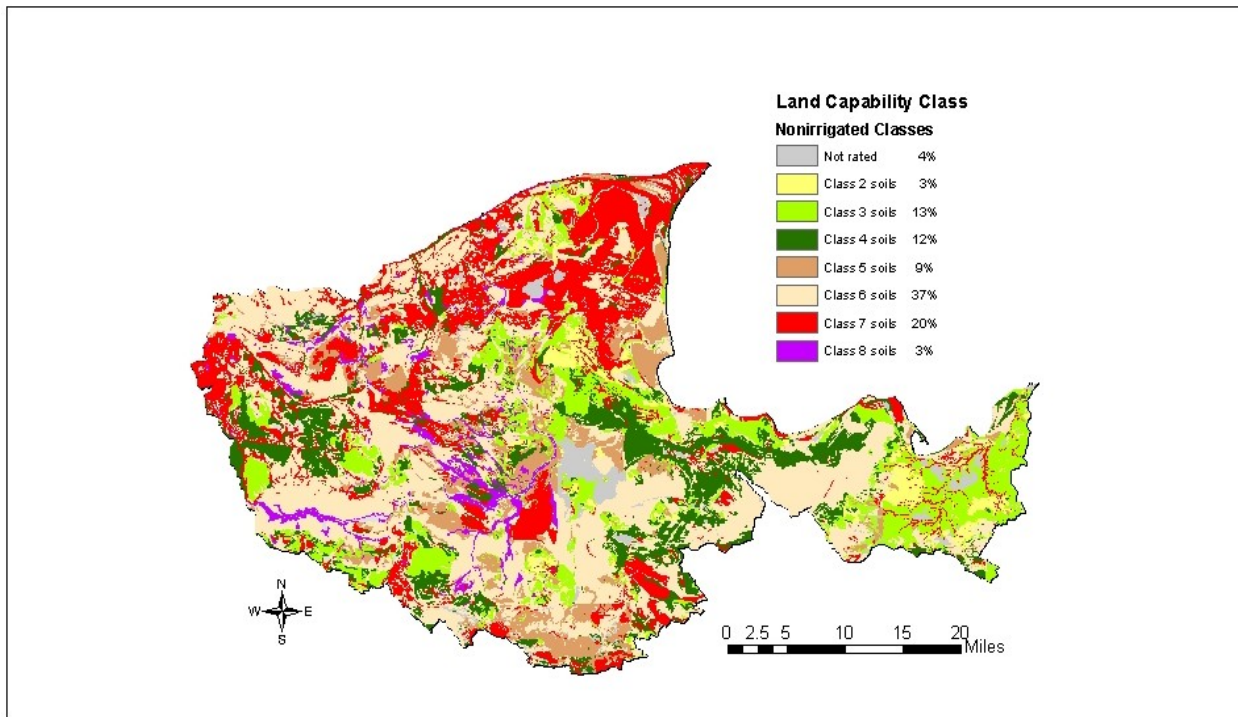
Minimum Annual Temperature Range

Average Annual Precipitation - 33 inches

Average Annual Minimum Temperature - 7 degree F

Average Annual Maximum Temperature - 77 degrees F

Land Capability Class (Non-irrigated)



Source: USDA, NRCS - Geodata: SSURGO Soils, Soil Data Viewer, Land Capability Class - Nonirrigated
Mapped by CEMCD on February 28, 2008

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive land forming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects.

Class codes 1, 2, 3, 4, 5, 6, 7, and 8 are used to represent both irrigated and non-irrigated land capability classes.

Class 1— Soils have slight limitations that restrict their use.

Class 2 — Soils have moderate limitations that reduce the choice of plants or require moderate conservation practices.

Class 3 — Soils have severe limitations that reduce the choice of plants or require special conservation practices, or both.

Class 4 — Soils have very severe limitations that restrict the choice of plants or require very careful management, or both.

Class 5 — Soils have little or no hazard of erosion but have other limitations, impractical to remove, that limit their use mainly to pasture, range, forestland, or wildlife food and cover.

Class 6 — Soils have severe limitations that make them generally unsuited to cultivation and that limit their use mainly to pasture, range, forestland, or wildlife food and cover.

Land Capability Class (Non-irrigated) (continued)

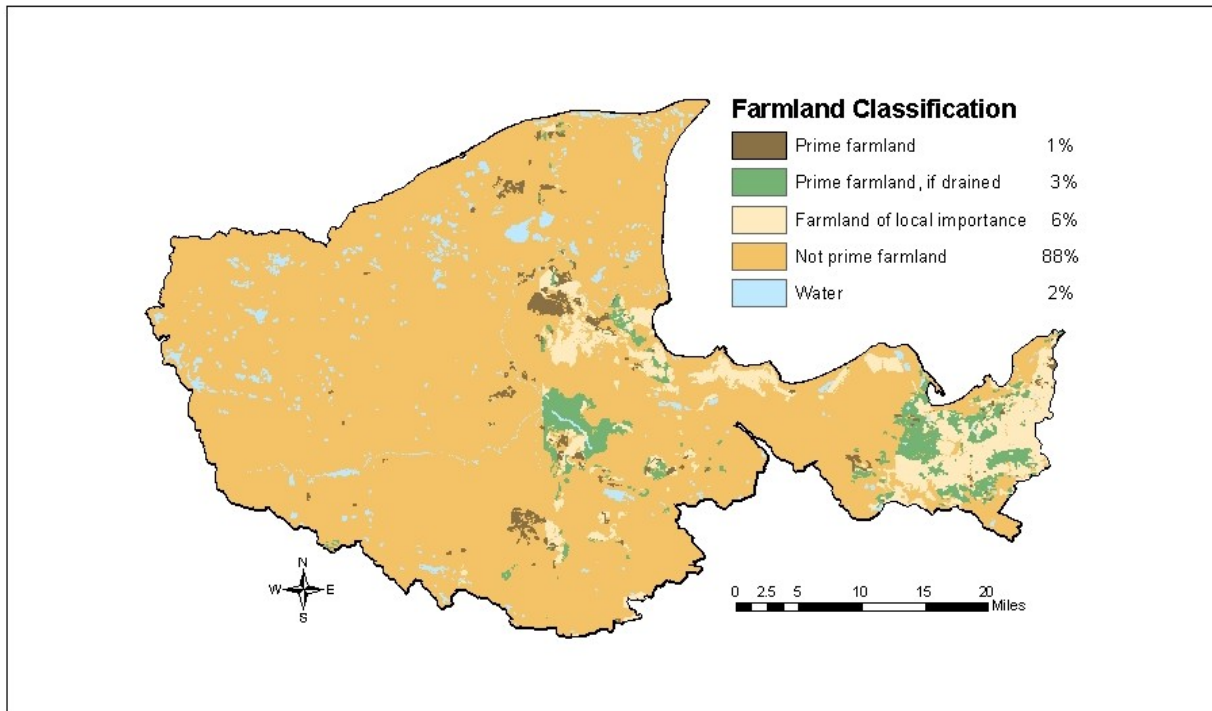
Class 7 — Soils have very severe limitations that make them unsuited to cultivation and that restrict their use mainly to grazing, forestland, or wildlife.

Class 8 — Soils and miscellaneous areas have limitations that preclude their use for commercial plant production and limit their use to recreation, wildlife, or water supply or for esthetic purposes.

The major soil classes found in the watershed are consistent with the predominate land use/land cover. Over half of the soils in the watershed have severe limitations that make them unsuited to cultivation and restricted to mainly forestland and wildlife.

Land Capability Class	Acres	Percent
Not Rated	35,778	4%
Class 2	29,334	3%
Class 3	126,979	13%
Class 4	120,412	12%
Class 5	87,003	9%
Class 6	358,537	37%
Class 7	190,505	20%
Class 8	27,329	3%
Totals	975,877	100%

Farm Land Classification



Source: USDA, NRCS - Geoata, Soils, Soils Data Viewer
Mapped by CEMCD on March 3, 2008

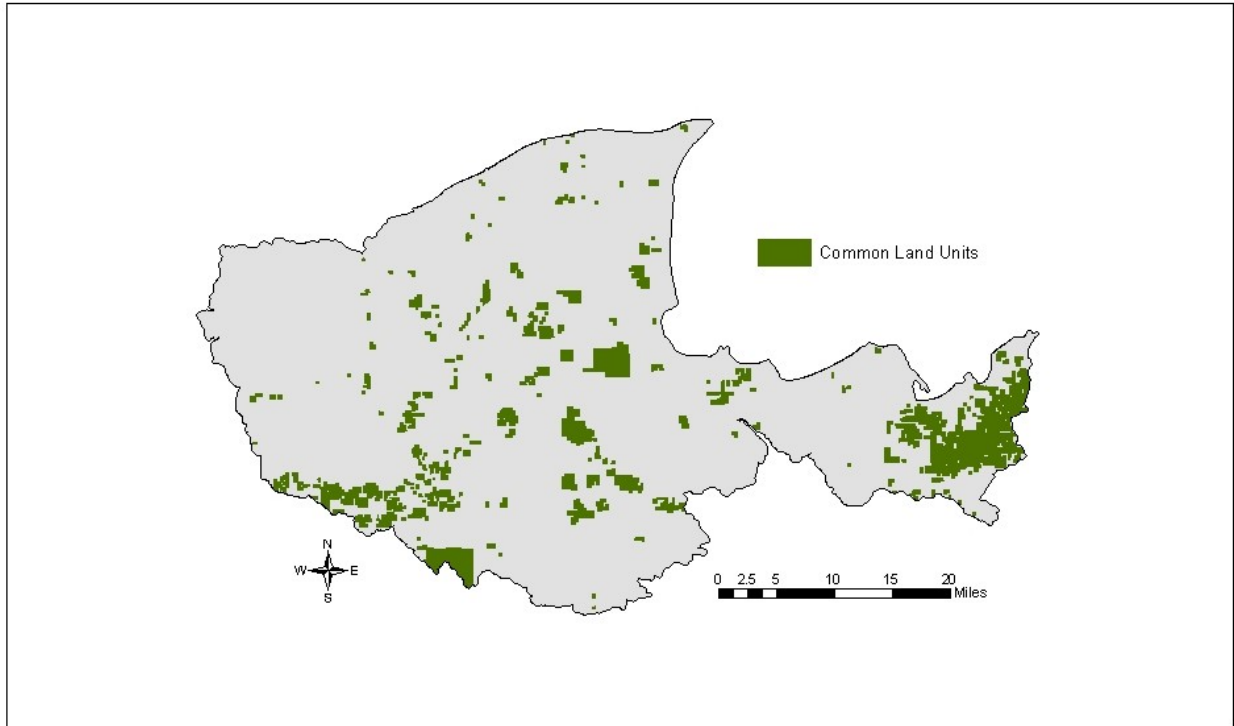
Farm Land Classification	Acres	Percent
1 - Prime Farmland	12,382	1%
2 - Prime Farmland, if drained	34,023	3%
3 - Farmland of Statewide Importance	0	0%
4 - Farmland of Local Importance	58,386	6%
5 - Unique Farmland	0	0%
6 - Not Prime Farmland	855,457	88%
7 - Water	15,629	2%
Total	975,877	100%

County	Farms	Acres	Average Size	Total in Cropland	Acres	Harvested Cropland	Acres	Total Income From Farm	Principal Operator Farming*	Principal Operator Other**
Alger	67	14,969	223	63	9,832	48	5,577	21	36	31
Chippewa	372	93,924	252	338	61,550	285	34,734	46	188	184
Luce	30	10,262	342	25	6,317	25	4,029	9	18	12
Mackinac	76	20,410	269	66	12,065	57	8,164	16	51	25
Schoolcraft	51	13,541	266	43	7,875	41	5,192	14	31	20
Totals	596	153,106	257	535	97,639	456	57,696	106	324	272

Source: Census of Agriculture

Common Land Units

A Common Land Unit (CLU) is the smallest unit of land that has a permanent, contiguous boundary, a common land cover and land management, a common owner and a common producer association. A CLU is delineated from permanent features such as fence lines roads, and or waterways. This requirement minimizes the number of changes that will be required in the CLU boundary.

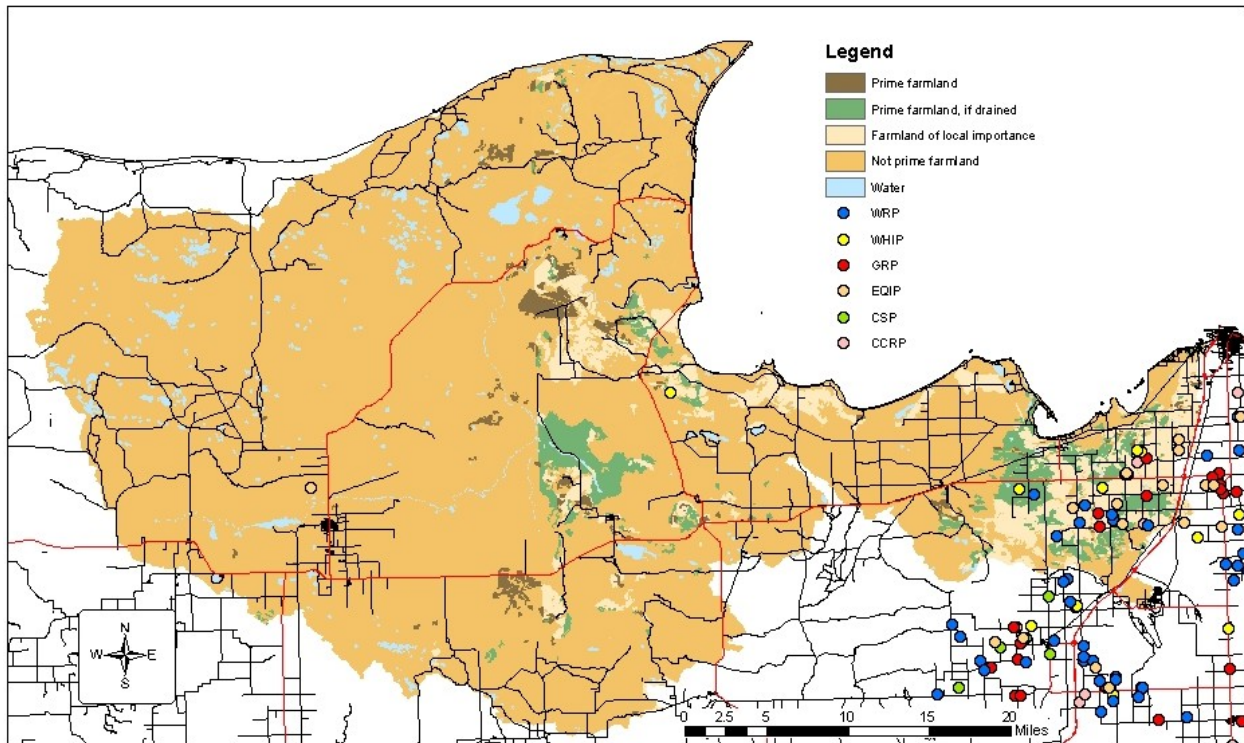


Source: USDA, NRCS: Geodata, Common Land Units
Mapped by CEMCD on March 3, 2008

Common Land Units	Farms	Acres
Two Hearted River Subwatershed	18	1,719
Betsy-Sheldrake Subwatershed	34	3,221
Tahquamenon River Watershed	276	40,751
Frontal Lake Superior Subwatershed	54	6,563
Waiska River Subwatershed	346	27,725
Total	728	79,979

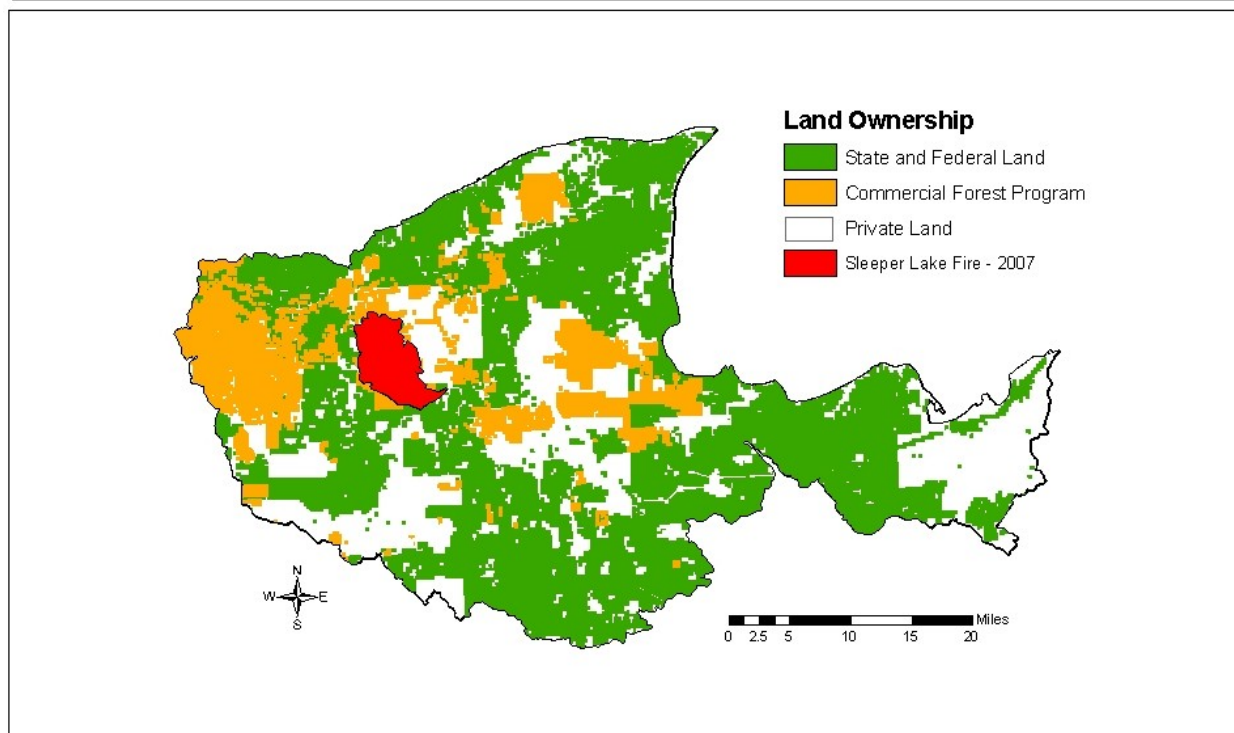
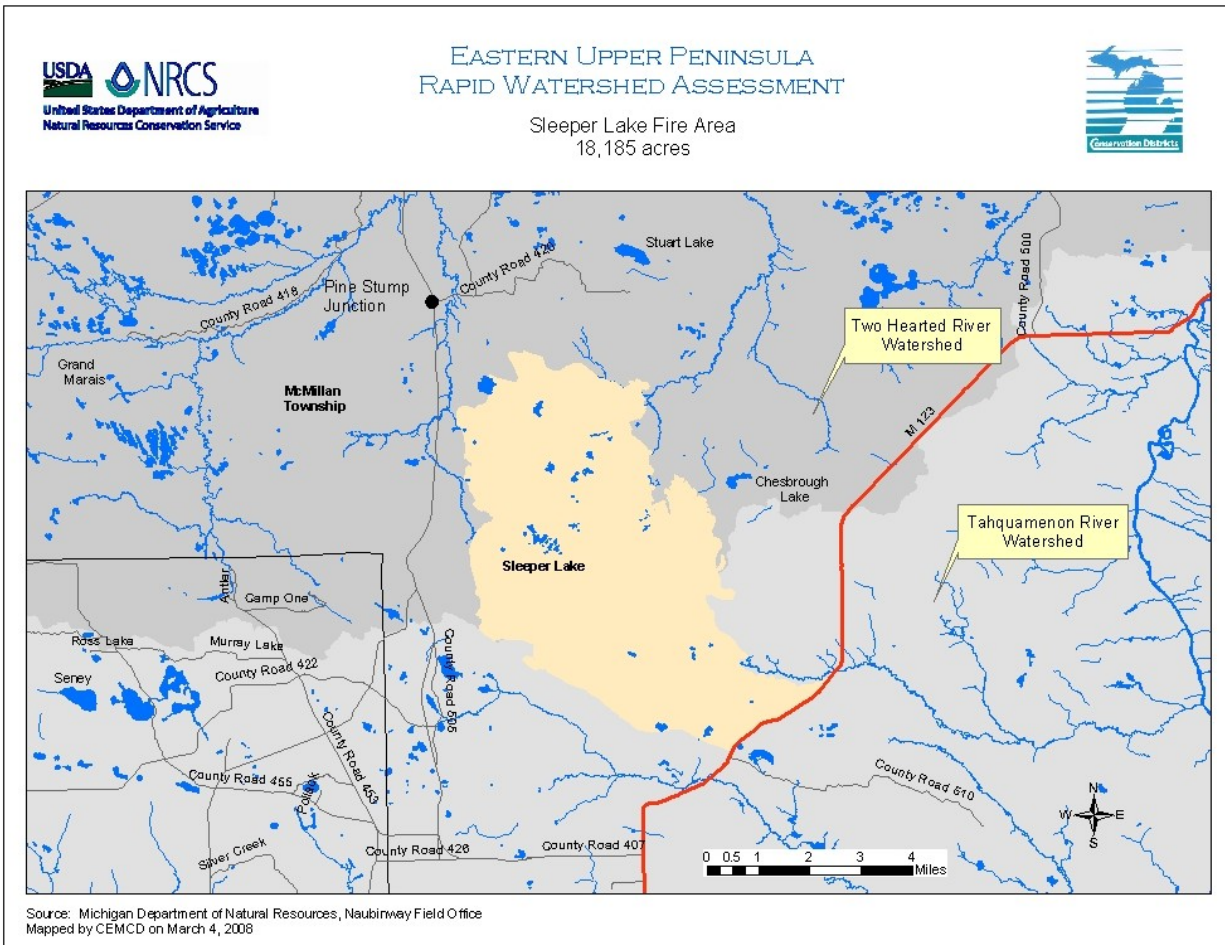
Summary	
Farms	728
Farm Acres	79,979
Average acres per farm	110

Farm Bill Programs



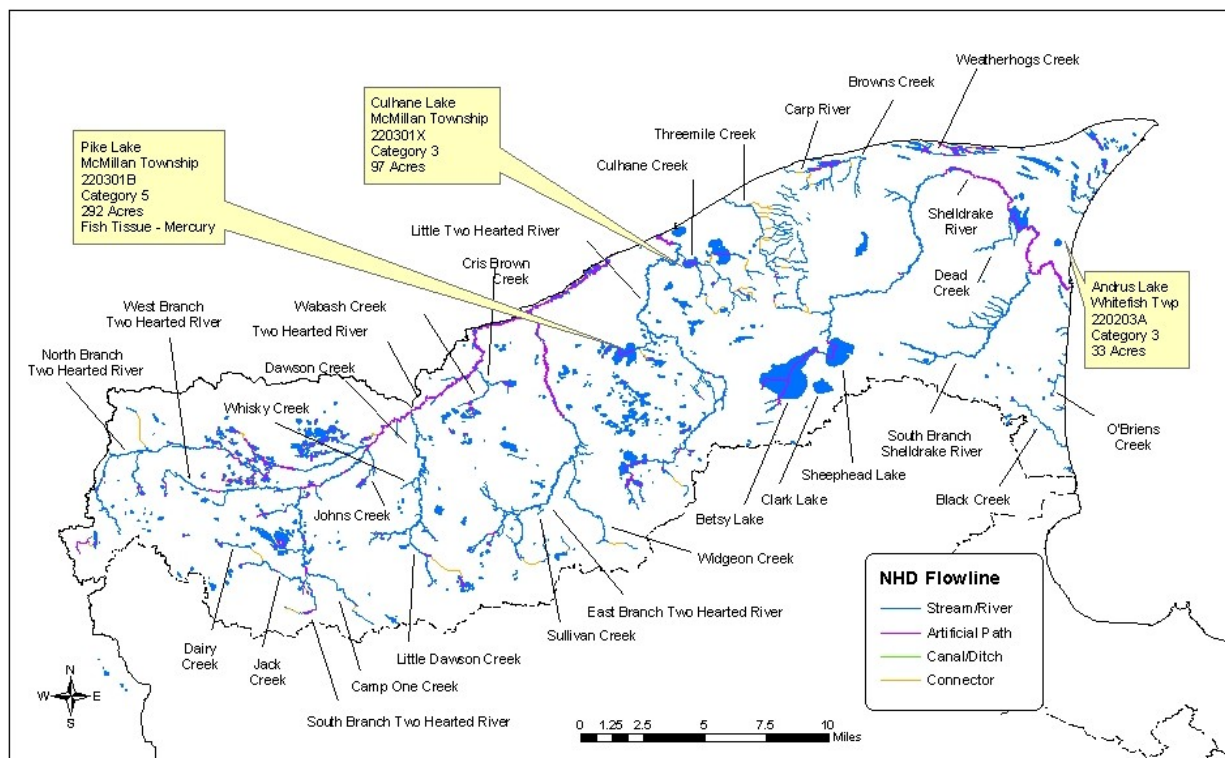
Active Farm Bill Projects in Eastern Upper Peninsula RWA			
Program Category	Number	Acres	Dollars
WRP	8	990.6	\$424,610
GRP	5	395.9	\$23,913
CCRP	5	62.8	\$19,342
EQIP	8	1,313.9	\$201,362
WHIP	5	27.7	\$16,166
CSP	0	0.0	\$0
Total	31	2,790.9	\$685,393

Sleeper Lake Fire



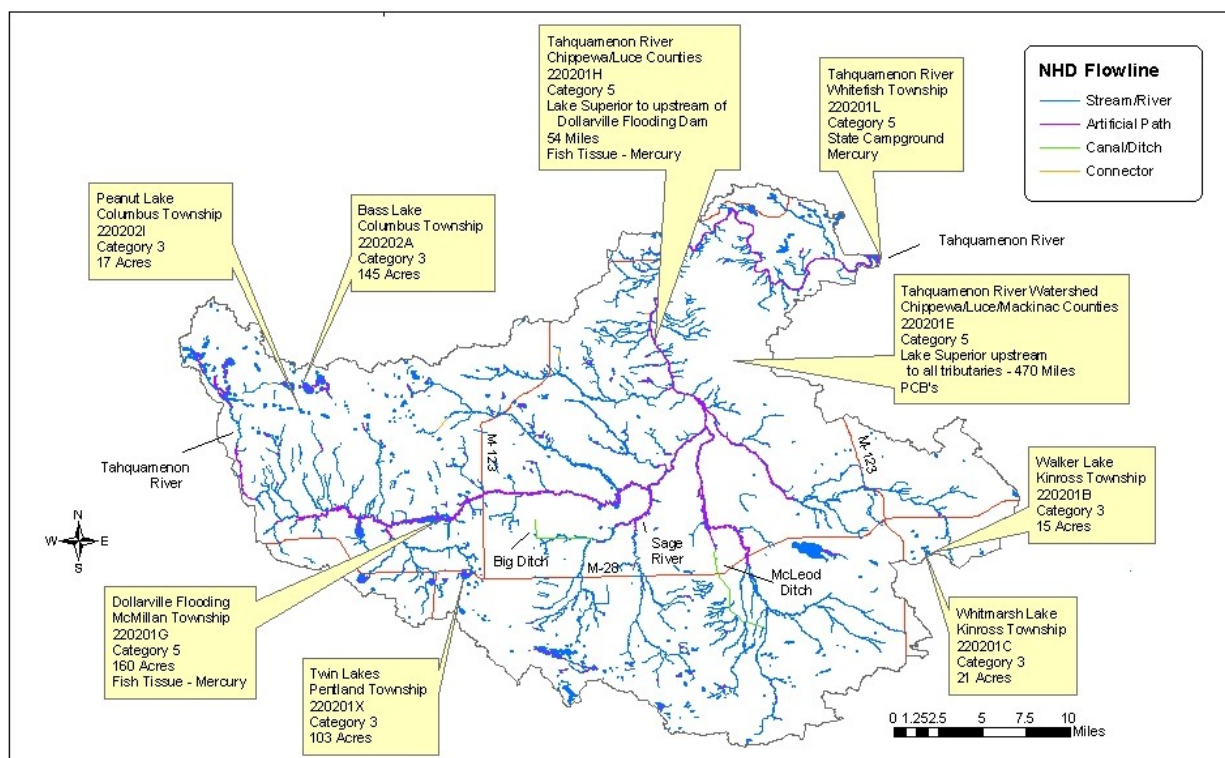
Source: Michigan Department of Natural Resources
Mapped by CEMCD on March 4, 2008

Two Hearted-Betsy Watershed 303d Sites



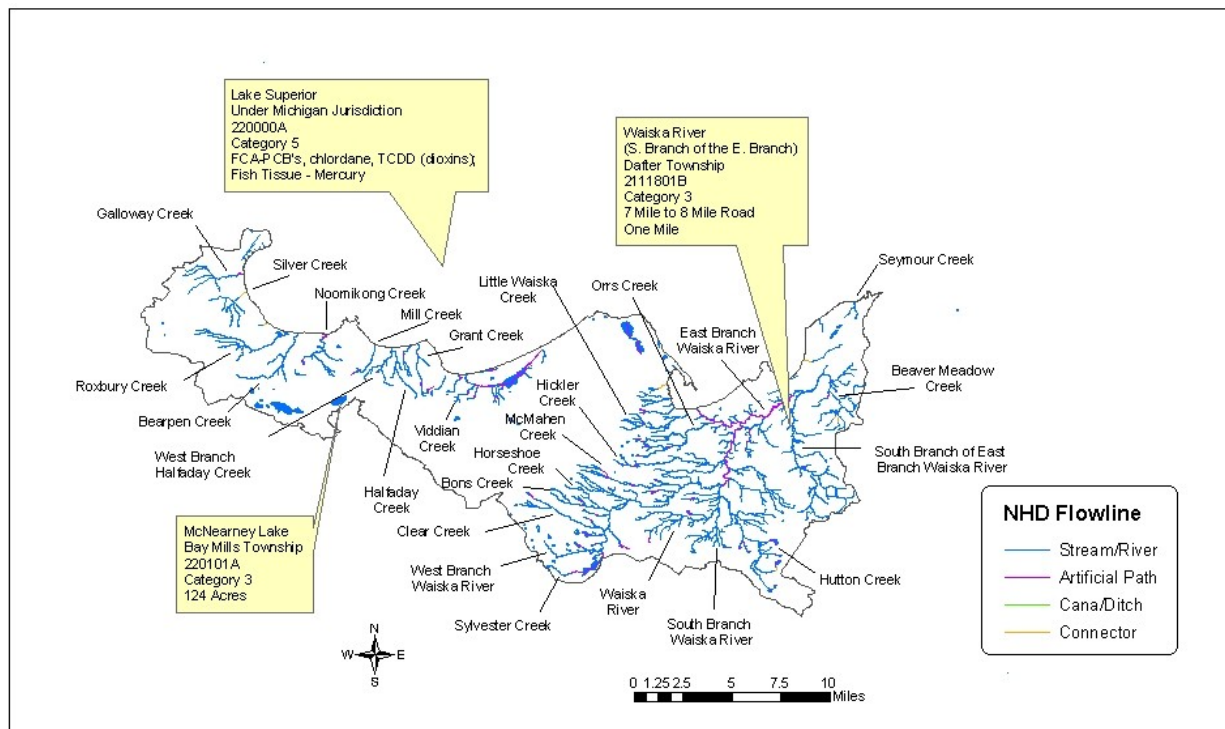
Source: Michigan Department of Environmental Quality (MDEQ)
Mapped by CEMCD on March 26, 2008

Tahquamenon River Watershed 303d Sites



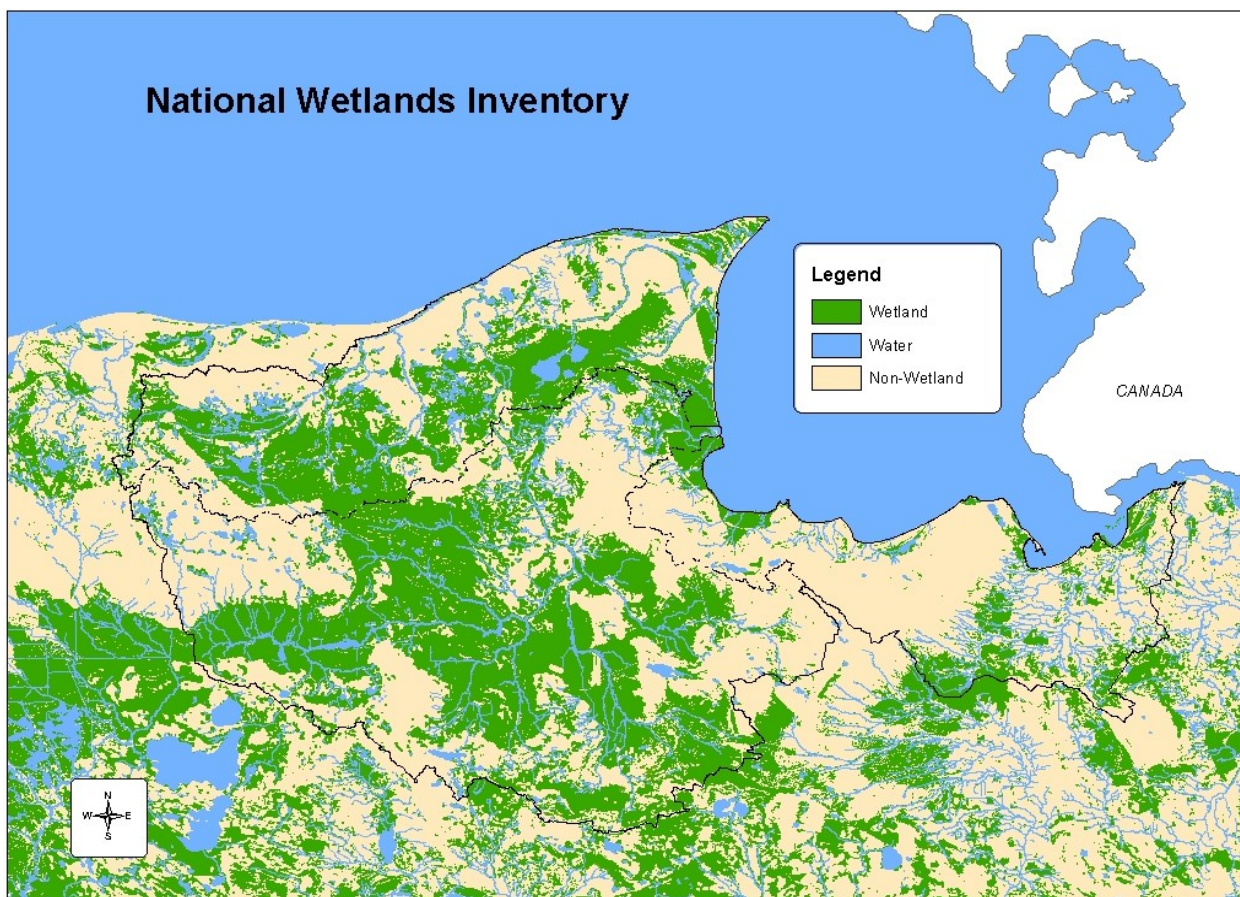
Source: Michigan Department of Environmental Quality (MDEQ)
Mapped by CEMCD on March 27, 2008

Waika River Watershed 303d Sites



Source: Michigan Department of Environmental Quality (MDEQ)
Mapped by CEMCD on March 27, 2008

National Wetlands Inventory



Source: USDA/NRCS - Geodats: National Wetlands Inventory
Mapped by CEMCD on April 2, 2008

Studies and Assessments

Several assessments and reports have been completed regarding the Two Hearted, Tahquamenon, and Waiskey Rivers. As part of their 5-year monitoring cycle for watersheds in the state, the Michigan Department of Environmental Quality performs biological surveys of the rivers to document water quality conditions, identify any non-point source impairments or potential threats to water quality, determines attainment status with Michigan's water quality standards (MWQS), evaluates any impacts from permitted discharges, and determines if changes water quality conditions have occurred over time. Erosion problems were identified on the Waiskey and Tahquamenon from a variety of sources, including agriculture operations, past logging operations, and road/stream crossings.

Resource Concerns

The primary resource concern in the watershed is sediment loading to surface waters. The Tahquamenon River has been significantly altered by historical logging operations, and erosion issues continue to occur at road/stream crossings and development near lakeshore and riparian areas. A significant land use in the Waiska River watershed is agriculture, and poor farming practices along with urban infrastructure allow significant sedimentation to the river. In the Two Hearted River sub basin, a significant portion of the land is in corporate ownership. There is rising concern over the future management of that land. Historically, it has been managed for silviculture. Indications, however, are that much of that land may be targeted for sale, land splits, and potential residential development.

Primary Resource Concerns
Soil Erosion — Agriculture/Urban Development Induced
Soil Erosion — Past Logging Operations
Hydrological Alteration — Agriculture/Urban Development
Water Quality — Surface Water Turbidity
Water Quantity – Spring/Fall Flooding; Summer Drought
Fish and Wildlife — Habitat Fragmentation
Plants — Soil Productivity; Plant Health and Vigor
Plants — Invasive Species
Animals — Quality and Quantity of Food and Forage

Eastern Upper Peninsula Rapid Watershed Assessment



United States Department of Agriculture
Natural Resources Conservation Service

Natural Resources Conservation Service
2847 Ashmun Street
Sault Ste. Marie, Michigan 49783

Upper Peninsula

*Resource Conservation
and Development Council*

Upper Peninsula Resource Conservation and Development Council
780 Commerce Drive, Suite C
Marquette, Michigan 49855



Luce/West Mackinac Conservation District
405 Newberry Avenue
Newberry, Michigan

and

Chippewa/East Mackinac Conservation District
2847 Ashmun Street
Sault Ste. Marie, Michigan 49783